A Look Back: Constructed Fishing Structures in Iowa's Man-made Lakes Jeff Kopaska

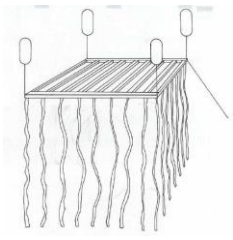
One of the simplest goals of fisheries research and management is to shorten the time between bites. There are a variety of ways this goal can be accomplished, and fisheries managers use many tactics – stocking, population assessment, water quality improvements, and installing fish habitat. Fish habitat is a term that is very popular these days. The newest section in AFS is the Fish Habitat Section. The big initiative to improve fishing and fish funding nationwide is the National Fish Habitat Initiative/National Fish Habitat Action Plan. But what do we mean by fish habitat, and why is it important.

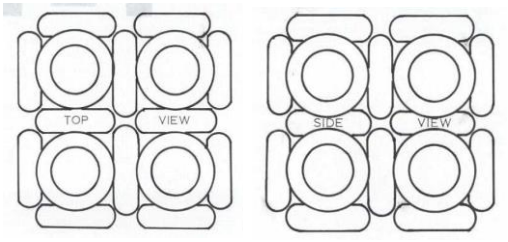
In the late 1970's, the Chariton Research Team started a project to catalogue the different types of fishing structures that were being built and deployed in Iowa's man-made lakes. This article is a brief summary of the findings from that study. For more information, contact Jeff Kopaska or Rebecca Krogman for a copy of the completion report.

The team started by selecting comparable lakes, with various structure types. They used many methods to sample areas in the lakes with and without structures. The idea was to compare sampling results between lakes, structure types, and fish species. The management implications from this research project were to develop guidelines for what types of habitat were most effective, and where these habitat projects should be placed to increase angler success.

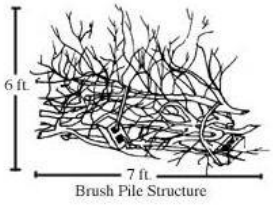
Study Methods:
Bluegill, crappies and largemouth bass were sampled from the four study lakes using both active and passive sampling gear. Gear used included trap nets, experimental gill nets, electrofishing gear and conventional fishing gear (angling). Each gear type was fished at a structure and a designated control area on the same day with equal effort. Control sites at each lake were 100-300 feet away from the structure site, in an area with similar depth and bottom substrate. Passive sampling was stopped during the study, due to ineffectiveness in determining differences about fish use of structures. Only the results of the angling portion of this study are discussed in this article. Angling gear used during the study were identical 5' light action rods with open-faced spinning reels and 4 pound test line. Angling effort was evenly split between using a nightcrawler on a no. 8 hook, and fishing a 1/16th oz. leadhead jig. Over 1,200 hours of angling effort occurred, evenly split between fishing structures and control sites. All sampling (angling, netting and electrofishing) happened between July 1 and October 8.

Structure types:
Figure 1 illustrates the variety of structures investigated during this study. These included: (a) floating reefs, (b) tire reefs, (c) stake beds, (d) brush, and (e) earthen ridges/mounds.

a) 

b) 

c) 

d) 

e) 

Figure 1. Fishing structures. Note: item (e) illustrates the current versions of fishing mounds that are built by the Iowa DNR. Mark Richardson indicates that the earthen ridges/mounds from this study —were small “rice-paddy” like earthen dikes; not armored or protected in any way. The berms were 2 feet off the bottom and you could cast all the way across one easily with light tackle and no weight. The outside edge of these were less than 30 feet from shore and not over 4 feet deep, with 12 to 18ll of water over the top.

Results:
Bluegill, crappie and largemouth bass were the most commonly sampled fish during this study, with over 24,000 fish sampled. Over 18,000 of the fish sampled were crappies, and 59% of these fish were sampled from structure sites (versus control sites). Bluegill were the second most abundant fish sampled, numbering just under 5,000 fish, and 75% were taken at structure sites. Nearly 650 largemouth bass were sampled during the study, and 87% of these fish came from structure sites.

Catch rates while angling showed a wide difference between structure sites and control sites. On average, per hour catch rates of largemouth bass were 5.6 times higher on structure versus control sites. Crappie catch rates were 4.3 fish per hour higher, and bluegill were 5.3 fish per hour higher on structure sites. The maximum differences were up to 30 times higher on structure sites for bass. Bluegills caught on structure were up to 1 inch smaller than fish caught at control sites, but there was no difference in the size of crappies or largemouth between structures and control sites.

Substantial differences existed for catch rates between lakes. The author suggests that these differences were due to the variety of fish densities at these lakes (Table 1), and the amount of fish habitat (natural and artificial), in these lakes.

Table 1.

Study Area Attribute / Lake	Area	Max. Depth	Mean Depth	SA:WA	Bluegill (lb/ac)	Crappie (lb/ac)	Bass (lb/ac)
Red Haw	64	40	14	1:14	168	16	98
Green Valley	428	26	10	1:12	382	306	52
Wapello	289	34	13	1:17	118	68	35
Hawthorn	177	33	13	1:19	--	--	--

Hawthorn Lake was the only lake with more than two structure types. Table 2 shows directly comparable catch rates for each species at Hawthorn Lake. All values are adjusted such that control catch-effort is unity.

Table 2.

	Control	Brush	Stakes	Tires	Ridges
Bluegill	1.0	1.7	2.5	3.0	6.9
Crappie	1.0	1.9	1.1	0.6	2.5
Bass	1.0	1.8	2.6	5.6	1.3

Discussion:
No one structure type was the best at all times, for all fish. Earthen ridges/mounds produced the best overall results, followed by brush and stake beds. The recommendations from the study were that multiple habitat types be installed in lakes, especially during construction or renovation. Shoreline and bottom contour modifications were of primary importance.

Improving fish habitats paves the way for better fish production, and higher concentrations of fish on structures. The bottom line is that habitat enhancement increased fishing success. And predictable, concentrated fish result in happy, successful anglers – because we shorten the time between bites.